

turned purplish on head and dorsum, stopped eating, and began wandering about the tin for a place to spin. The brown ones turned duller in color.

Aug. 3. They had spun slight cocoons.

Aug. 7. They pupated.

This account gives the dates of moults, spinning and pupation of the larvae first hatched. The others were later in all their changes, and the last hatched did not grow so large or so rapidly as the first.

These larvae were very voracious, and ate even the berries of the *Lonicera* and the stems down to the woody twig. They required food-supply three times

a day, after the fourth moult, although the tins were large and but thirteen larvae were kept in one tin.

They were very placid, slow, easy-going larvae, bore any amount of handling, and were crawled over by each other without any of the petulant twitching and biting always shown, under such circumstances, by larvae of *juglandis*, *astylus*, *abbotii*, and other Sphingidae.

Out of the 120 larvae we undertook to rear only two died, and those two were from the last eggs laid and died in moulting.

BROOKLINE, MASS. Aug. 8, 1891.

NOTES ON BOMBYCID LARVAE.—II.

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ORGYIA DEFINITA Packard. (For references, see above, p. 111; to which add:)

1890. Leifert, 5th rep. U. S. ent. comm. p. 561.

First larval stage. Head pale testaceous, darker on the vertex; ocelli black, mouth brown; width 0.5 mm. Body pale whitish, the subdorsal warts on joint 2 larger than the rest, the dorsal warts blackish. Hair long, pale whitish. There are no pencils nor brush-tufts of hair and no retractile tubercles on joints 10 and 11. As the stage advances all the warts become dark.

TORTRICIDIA FLAVULA Herrich-Schaffer.

1854. Herr.-Sch., Sam. ausser. schmett., fig. 185.

Mature larva. By its shape allied to the larva of *Lithacodes fasciola* H.-S. Head retracted beneath joint 2, which is in turn re-

tracted beneath joint 3; greenish testaceous, mouth parts brown, ocelli black. Body elliptical, the sides sloping from a slight subdorsal ridge, and contracted between joints 12 and 13, giving the last segment a square appearance. Bright green, the dorsum largely covered by a patch of salmon color or purple brown bordered with a crimson line and a yellow shade. It begins somewhat broadly above the head on joint 3, narrows at once to a dorsal band on joints 4 and 5, widens twice, the second time passing down to the subventral edge of the body at joint 8, then narrows twice (this part of the outline varies in different examples), and tapers to a point at the anal extremity. The body is covered very minutely with translucent granulations, the usual elliptical depressions hardly distinct, smooth, whitish in the dorsal patch, and containing a dorsal and lateral row of blackish spots. Length 9 mm.

The cocoon and pupa do not differ from those of all the other Cochlidiæ.

Food plants. Deciduous trees.

I have bred from these larvae four moths which are alike, and correspond with Herrich-Schäffer's figure. Under a glass there can be distinguished a few brown scales representing the usual lines. In the Elliot collection, now in the American Museum of Natural History, is a fine series of a *Tortricidia* which represents both *T. flavula* and *T. pallida*, with a number of examples that appear to connect the two. In *T. pallida* the lines are present very much as in *Limacodes flexuosa* Grt.,* but the inner one is somewhat curved as Herrich-Schäffer figures it. *T. pallida* can be distinguished from *L. flexuosa* by the pale, flesh-color shading that is seen to overspread the basal half of primaries in certain lights, while in *L. flexuosa* the wings are uniformly ochreous. The two species are closely related however.

APATELODES TORREFACTA *Abbot & Smith.*

1797. A. & S., Lep. Ins. Ga., tab. 76.

1889. Soule, Psyche, V, 148.

1890. Packard, Proc. Bost. soc. nat. hist. XXIV, 519.

More observations are needed to determine the number of larval stages of this species. Miss Soule finds five stages, and Dr. Packard has recorded six, but it is almost certain that both have found too few, and, as no measurements of the head are given, it is impossible to tell where the error is.

I obtained the larva on July 30, apparently about half grown. It molted four times, and the measurements of the head for the five stages which I observed were as follows:—

1.3 mm., 1.6 mm., 2.1 mm., 2.6 mm., 3.2 mm.

These correspond very well with the series derived with the ratio. So by calculation from the last stage. But, if there are only six stages, the newly-hatched larva would have

* I have elsewhere called attention to the probable synonymy of this species.

a head 1.05 mm. wide, which would be very unusual for a larva as small as this. Of the species which I have recorded in Psyche, vol. 5, p. 420, *et seq.*, the only larva hatching with a head this size is *Platysamia cecropia*, which is, of course, a very much larger insect. If we calculate the series further back, say to ten terms, we have the following result:—

0.42, 0.53, 0.66, 0.83, 1.05, 1.31, 1.64, 2.05, 2.56, 3.20.

In my opinion, 0.83 mm. or 0.66 mm. would be about right for this larva in the first stage, and hence I conclude *Apateledes torrefacta* has as many as seven or eight stages.*

I shall be much interested to have this verified or disproved, which can be easily done by any one who can determine the width of the head of the newly-hatched larva from a living or an alcoholic specimen.

GLUPHISIA TRILINEATA *Packard.*

1864. Pack., Proc. ent. soc. Phil., III, 355.

1883. Edwards & Elliot, Papilio, III, 129.

The larva of this species has been briefly described in its last stage by Edwards & Elliott. It is not uncommon on poplar in Dutchess and Ulster counties, N. Y., often associated with *Raphia frater*, which it much resembles in general structure, though it is more slender. It is unusually plainly marked and inconspicuous for a Ptilodontid larva; the anal feet are used for walking, and the body is smooth, without tubercles or processes. The eggs are shaped like the upper third of a sphere, flat on the under side. Their color is pale yellowish green, very minutely and densely punctured. Diameter about 0.9 mm. They are probably laid singly.

I believe there are five larval stages, though I have not observed the first. The second, third and fourth are so much like the fifth

* If the width of the newly hatched larva is about one half the width of the egg, as seems in general to be the case, then 0.66 mm. would be right and the species would have eight stages.

as described by Edwards & Elliot, that I will not re-describe them. When young the larvae each rest on a little web on the under side of a leaf, the head held out quite flat. The mature larva is thickest at joint 9, and tapers slightly to the extremities. Beside the yellow subdorsal band mentioned by the describers there is a fainter white substigmatal one on joints 2-4.

The widths of head for the five stages, calculated and actually found, are as follows:—

Calculated.—0.48, 0.74, 1.14, 1.75, 2.7 mm. Ratio, 0.65.

Found.—0.7, 1.2, 1.7, 2.7 mm.

The cocoon is formed of few threads, at the ground. The pupa is very dark brown, almost black; flattened on the ventral side, the dorsum evenly rounded; finely punctured. The abdominal segments are closely appressed, motionless; cremaster none, anal segments evenly rounded. Length 10 mm., width 4.5 mm.

There are two broods each year, and the winter is passed in the pupal stage.

EDEMA ALBICOSTA *Hübner*.†

Hübner, Noct. 440.

Herr-Sch., Syst. bearb. sch. Eur. fig. 131.

1871. Staudinger, Cat. Lep. Europ. (Note.)

This larva has not such an abnormal development as I have supposed. I have recalculated the series for the widths of head, and find the following much better than the one I gave in *Psyche*, v. 5, p. 421, viz.:—

Calculated.—0.61, 0.85, 1.19, 1.66, 2.30, 3.2. Ratio, .72.

Found.—0.4, 0.7, 1.3, 1.7, 2.3, 3.2 mm.

This fits the observed facts except in regard to the first two stages, and I may have measured them too small. All the measurements were taken from living larvae, and hence are liable to some discrepancy.

The species has six larval stages, which is abnormal among the *Ptilodontes* if we except *Ichthyura inclusa*,‡ which seems to have also six stages, and the species of *Apatelodes* and *Nadata*, which probably have even more.

THE NEW CATALOGUE OF EUROPEAN COLEOPTERA.*

This is in every way the most elaborate and important edition (No. iv) of the Catalogue of the European Coleoptera yet published. It is on a somewhat new plan. The family arrangement is that usually followed in Europe. The sequence of the genera and species is that adopted by some monogra-

pher of the family, or genus, usually the latest, reference to whose work is made under the title. The name of the species, with the principal synonyms, and the authorities for their creation, with other useful bibliographical references follow, as well as indications of geographical distribution within the faunal limits laid down. In the preface it is stated that the work was parcelled out to Mr. L. Ganglbauer, Dr. L. v. Heyden, Dr.

* *Catalogus Coleopterorum Europae, Caucasi et Armeniae Rossicae*. Edited by Edmund Reitter. Berlin, Mödling, Caen. 1891.

† I have erroneously referred to this species in *Psyche*, v. 5, p. 421, as *E. albifrons* S. & A. All the specimens which have occurred to me at Rhinebeck, N. Y., have been *E. albicosta*, as I have recently discovered. The species may readily be separated by the character of the projecting tooth of the white costal

band, which in *albifrons* is regularly rounded, but in *albicosta* is sharply pointed or dentate. I strongly suspect that the larvae described by Mr. Beutenmüller in *Ent. Amer.* vol. 6, p. 75, and by Dr. Packard in *Proc. Bost. soc. nat. hist.* vol. 24, p. 525, as *E. albifrons*, are really those of *E. albicosta*.

‡ Prof. French finds six stages for *I. palla* (= *inclusa*) in *Can. ent.*, v. 17, p. 42, and I have measurements which, as far as they go, corroborate him.